

The Effect of Environmental Conditions on Optically Stimulated Luminescent Dosimeters

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Radiation monitoring is necessary for nuclear medicine technologists due to their exposure to radiation while working closely with radioactive materials and patients. Optically stimulated luminescent dosimeters are a type of radiation monitoring device that many technologists wear to monitor total exposure. Nuclear medicine technologists may expose their optically stimulated luminescent dosimeters to a variety of environmental conditions such as temperature changes and moisture. This study tested how this exposure effected radiation dose measurements. A Co-57 dose calibrator source was used to irradiate thirty optically stimulated luminescent (OSL) dosimeters at a rate of 0.02 to 0.03 mSv/hr for eighteen hours. The badges were split into groups of five; groups were exposed to sunlight, a refrigerator, a freezer, a wash/dry cycle, and dental x-rays. Five badges were not exposed to environmental conditions, while another, set of five badges were not exposed to radiation and served as controls. The badges were then sent to the manufacturer where they were evaluated for total radiation exposure readings. The largest average radiation exposure in the data was from the badges exposed to the refrigerator which also had the greatest amount of variance within the dose equivalent values. All of the data sets, including unexposed and exposed controls, had substantial exposure variation within the groups of conditions. No environmental condition produced a consistent alteration in OSL dosimeter readings.